

of my view. This is all I desire to say upon the subject at present. Although I now firmly believe that the valvular orifice in the Cystidea, the larger lateral aperture of the Blastoida, and the so-called proboscis of the palæozoic Crinoids are all oro-anal in function, yet I shall not maintain that view obstinately against good reasons shown to the contrary.

XVII.—*On a Species of Arenaceous Foraminifer* (?) from the Carboniferous Limestone of Devonshire. By EDWARD PARFITT, Esq.

[Plate XI. figs. 9-12.]

To the Editors of the Annals and Magazine of Natural History.

GENTLEMEN,

I beg to enclose you a rough sketch of what I had at first regarded as a species of *Cliona* new to science; but on a more extended acquaintance with the specimens, and comparing them with the beautiful figures of the arenaceous Foraminifera described by Dr. Carpenter in the Royal Society's 'Transactions,' vol. clix. part 2, plates 72-76, I am now more inclined to regard it as a sessile arenaceous Foraminifer. This species or form I met with on a block of carboniferous limestone brought from the quarry of Westleigh, near Tiverton, Devonshire. The specimen covered a space of eight or ten inches, and was so consolidated with the rock that, had it not been for the weathered surface, I should have passed it by.

The weathered surface has just the appearance of what we might expect to see in a free fossil *Cliona*; the resupinate stolons, variously branched and attached, quite resemble those of the recent forms of this genus (fig. 9). On having a small specimen cut and polished, I was much surprised to find that all the interstices between the stolons were filled with sand, charged more or less with a ferruginous tint; and on applying nitric acid to the surface for some time, this ate away the calcareous portions and left the interstices standing up prominently between the calcareous disks. The sand, as now exposed, appears to be quartz; and, generally speaking, the grains are as sharply angular as if it had just been broken up on purpose for this animal, and used by it directly. On comparing the part which had been submitted to the acid with the figures in the Royal Society's 'Transactions,' pl. 76, there is a very strong family likeness at once apparent. In my specimen the labyrinthiform spaces are filled with calcareous matter of the same colour as, and apparently very little different from, the limestone; at the same time each of the spaces of the

labyrinthic structure shows a dark centre, more or less irregular in shape, as if the crystallization or infiltration had begun round the walls and had not quite filled up the centre of each space. The whole of the arenaceous walls or framework is rendered solid by the infiltration of the calcareous matter, so that even the quartz grains require nitric acid of its full strength to separate them. So far, I have not observed any shells of Foraminifera or any extraneous material worked into the walls of this species, more than the grains of quartz-sand; and if the calcareous matter were withdrawn, leaving only the arenaceous walls, the difference between a portion of this and Dr. Carpenter's figure (t. 76. fig. 2) would be very little indeed.

In some of the labyrinthiform spaces there may be observed, besides the one dark irregular mark, two or three small specks like imperfect cells: in one place I observed three elliptical disks, with perfectly formed double rings or walls; but although these disks have at first sight the appearance of sections of corals, the annulations are only paler-coloured lines, and not solid walls. The two loops in the left-hand figure and the septa in the lower figure are all of the same kind (see fig. 12); they do not appear ever to have been solid structures. When I first saw these cells, I thought it probable that the foraminiferous animal had grown up round some stems of corals for support; but on a more careful examination I am compelled to give up this opinion.

Now the question is, what is this animal, and what position can we assign to it in the scale of creation? It does not appear to be a *Cliona*; or if it is, its habits are quite different from those of other forms I am acquainted with; nor does it agree well with the arenaceous group of sponges, the "*Dysidea*," so far as I know them; but, viewing this in all its bearings, it appears to me to hold a place between the arenaceous Sponges and the arenaceous Foraminifera. The stoloniferous growth is common to both; in the Foraminifera there appears to be a much greater degree of regularity observed in building up their structures than is seen in the habits of the stoloniferous Sponges. The general growth of the Foraminifera is more or less concentric, starting from a primordial cell; in the fossil we have under consideration no such growth can be traced, although no doubt this also sprang from a primordial cell. But I would not insist upon this, as it may have been a gemma or bud, or even a group of cells; but whatever its beginning may have been, it has spread over several inches of the carboniferous limestone, and was also three or four inches thick. There is not the least sign of its ever having been circumscribed by a test of any kind, but it appears to

have spread out over the rock in the same manner as we observe in the recent sponges.

I have said above that the interstices between the stolons or labyrinthiform structure are filled with sand, and from its appearance and hardness I thought it was quartz, as it is much harder than the limestone or calcareous matter which fills the stoloniferous structure, and resisted the action of the acid so thoroughly, while the interspaces were quite eaten away, that walls of crystals, as they now prove to be, were left standing up round the interspaces. My friend Mr. Vicary has kindly submitted a fragment of this fossil to the blowpipe, when it burns into a white lime, with minute scattered points of a metallic substance resembling iron, probably a carbonate or sulphate of iron. It is this, no doubt, which has given the crystals a ferruginous tint.

It has struck me as very curious, since it has been discovered that the crystals are calcareous, and, from their rhomboid form, they are believed to be carbonate of lime. If this be really the case, it would seem that this was an animal secretion. The crystals are very irregularly deposited, and adhere to each other at various angles; they are nearly all of the same size. I have met with similar crystals on the membranes or chitinous matter in the shells of *Carcinus mænas*; and they are also found in the shells of oysters, on the animal secretions; it is therefore not singular that they should be found here, and more particularly as both the Spongiadæ and the Foraminifera secrete calcareous or siliceous matter as the case may be. The crystals measure $\frac{1}{80}$ of an inch in diameter, varying but little in size. If these grains, or crystals as they now prove to be, had really been quartz, as I at first considered they were, I should then have thought that I had a new form of *Cliona* before me, and that it had the habit of constructing an arenaceous covering for itself. It may be thought by some, perhaps, that this was a burrowing *Cliona*, and that the infiltration of the calcareous matter into the stoloniferous structure may have quickly succeeded the death of the animal, and what are now crystalline rhomboidal prisms may have succeeded the decay of the rock or shell in which the *Cliona* lived and died. But I do not think this can have been the case. In the first place, the thickness is against it; and in the next, what should have precluded the infiltration into the decaying shell (an assumed shell) of the same material as that which fills the labyrinthiform or stoloniferous structure? I know of nothing; and I think, therefore, that we must fall back upon the supposition that this animal secreted the carbonate of lime. I scarcely know

what provisional name to give this fossil, and shall therefore let it stand over to some future time.

I am, Gentlemen,

Yours obediently,

EDWARD PARFITT.

Devon and Exeter Institution, Exeter.

EXPLANATION OF PLATE XI. figs. 9-12.

- Fig. 9.* Portion of weathered surface with the crystals of carbonate of lime washed out or decayed: enlarged.
Fig. 10. Specimen cut horizontally, showing the interstices of the stolons filled with crystals: enlarged.
Fig. 11. End view of specimen, showing the stoloniferous masses standing out free. The cross lines are the natural size of the specimen.
Fig. 12. Three cells (?), showing indications of double walls and septa: magnified.

XVIII.—*Reply to Dr. Gray on Testudo chilensis* &c.

By P. L. SCLATER, Ph.D., F.R.S.

To the Editors of the Annals and Magazine of Natural History.

GENTLEMEN,

Dr. Gray, following his habitual practice, has thought proper to reply to my scientific criticisms upon the species described by him as *Ateles Bartletti* and *Testudo chilensis* with a series of personal remarks which I do not care to notice. As, however, one of the charges made against me would, if true, affect the credit of this Society, I request you to publish, in answer thereto, the subjoined account of some observations on this subject made at the meeting of this Society last evening.

I may also as well state that it is not correct that (as assumed by Dr. Gray) my information as to the synonyms of the (so-called) *Testudo chilensis* was obtained from Dr. Gray's "short note."

I am, Gentlemen,

Your obedient Servant,

Zoological Society of London,
 11 Hanover Square, London, W.
 January 17th, 1871.

P. L. SCLATER.

"On concluding my series of reports upon the additions to the Society's menagerie for the past year, I beg leave to take this opportunity of calling the attention of the meeting to the register of accessions to the menagerie now lying on the table.